

05/05  
**Work Order ID 162416**

**\*162416\***

Page 1

Tuesday, June 06, 2017 4:57:32 PM

Item ID: 646.3311

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: RH Half - Upper Cutter Assembly

Start Date: 6/8/2017 Start Qty: 4.00

**\*4\***

Cust Item ID:

Required Date: 6/29/2017 Req'd Qty: 4.00

**\*4\***

Customer:

Reference:

Approvals:

Process Plan: W

Date: \_\_\_\_\_

Tooling: \_\_\_\_\_

Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_

Date: \_\_\_\_\_

SPC (Y/N): \_\_\_\_\_

Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

646.3300

N/C3

110

4.35

**\*110\***

HAAS CNC VERTICAL MACHINING #1

HAAS 1

HAAS CNC vertical machine #1

Memo

1-Machine per folio FB154

DWG REV: N/C

FOLIO REV: 99

Blank 13.375

1.77

2- deburr and break all sharp edges

120

QC2- Inspect parts off machine FAI/FAIB

0.00

**\*120\***

QC

Quality Control

Memo

0.00

DAS  
49  
9-89

17-06-14

DAS  
49  
9-89

17-06-14

DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                              |                                             |                                                                                                                                                                                    |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |
|--------------------------------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------|---------------------------------------------|-----------------------------------|---------------------------------------|------------------------------------------------|------------------------------------|--------------------------------|-----------------------------------------------|----------------------------------------|-----------------------------------|---------------------------------|-----------------------------------------------|-------------------------------|-----------------------------------------|---------------------------------------|-----------------------------------|-------------------------------------------------|------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------|------------------------------------------|--------------------------------|----------------------------------------|------------------------------------------|-------------------------------------|---------------------------------------------|-------------------------------------------|-----------------------------------|--------------------------------------|----------------------------------|----------------------------------|-------------------------------------------|----------------------------------|-------------------------------------|----------------------------------------|-------------------------------------|---------------------------------|------------------------------|----------------------------------------------|---------------------------------------------|----------------------------------------------------------|---------------------------------------|----------------------------------|-------------------------------------|----------------------------------------------|----------------------------------------|--------------------------------------|------------------------------------------------|-------------------------------------------|-------------------------------------------|------------------------------------------------|---------|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ |                                             | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> |                                           | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>             Skid-tube <input type="checkbox"/><br/>             Machining <input type="checkbox"/><br/>             Thermoforming <input type="checkbox"/><br/>             Large Fab <input type="checkbox"/> </div> <div>             Cross tube <input type="checkbox"/><br/>             Small Fab <input type="checkbox"/><br/>             Finishing <input type="checkbox"/><br/>             Composite <input type="checkbox"/> </div> <div>             Water Jet <input type="checkbox"/><br/>             Prod. Eng. Coord. <input type="checkbox"/><br/>             Rec/Store/Packaging <input type="checkbox"/><br/>             Supplier <input type="checkbox"/> </div> <div>             Engineering <input type="checkbox"/><br/>             Quality <input type="checkbox"/><br/>             Other <input type="checkbox"/> </div> </div> |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |
| Date :                                                       |                                             | Step #:                                                                                                                                                                            |                                           | QTY Effective :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |                                 |                                   | MRB (QSI042) Approval                                                                                              |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |
| Description Work Order Deviation                             |                                             |                                                                                                                                                                                    |                                           | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                           |                                 |                                   | Completed By<br><br><br>Lead hand / Supervisor<br>Approval Verification<br><br><br>QC / QA Coordinator<br>Approval |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |
|                                                              |                                             |                                                                                                                                                                                    |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |
|                                                              |                                             |                                                                                                                                                                                    |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |
| Root Cause                                                   |                                             | FAULT CATEGORY                                                                                                                                                                     |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |
| Environment <input type="checkbox"/>                         | No Re-verification <input type="checkbox"/> | Pressure/Forced <input type="checkbox"/>                                                                                                                                           | Temperature/Cure <input type="checkbox"/> | Power Loss/Surge <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Positioned Wrong <input type="checkbox"/> | Design <input type="checkbox"/> | Operator <input type="checkbox"/> | Bending <input type="checkbox"/>                                                                                   | Set-up <input type="checkbox"/> | Folio/Program <input type="checkbox"/> | Outside Dimensions <input type="checkbox"/> | Doc/Data <input type="checkbox"/> | Offset/Setup <input type="checkbox"/> | Centre Not Concentric <input type="checkbox"/> | BOM/Route <input type="checkbox"/> | Grain <input type="checkbox"/> | Over/Under tolerance <input type="checkbox"/> | Equip/Tooling <input type="checkbox"/> | Supplier <input type="checkbox"/> | Cracks <input type="checkbox"/> | Broken/Damage/Defect <input type="checkbox"/> | Weld <input type="checkbox"/> | Part Incorrect <input type="checkbox"/> | Handling/Pre <input type="checkbox"/> | Training <input type="checkbox"/> | Crimp/Kink/Ripple/Wave <input type="checkbox"/> | Inspection Incomplete/Unqualified <input type="checkbox"/> | Wrong Stock Pulled <input type="checkbox"/> | Part Lost/Missing <input type="checkbox"/> | Material <input type="checkbox"/> | Use for Testing <input type="checkbox"/> | Cuffs <input type="checkbox"/> | Contamination <input type="checkbox"/> | Out of Sequence <input type="checkbox"/> | Part Moved <input type="checkbox"/> | Internal Transport <input type="checkbox"/> | Poor Information <input type="checkbox"/> | Crushing <input type="checkbox"/> | Countersink <input type="checkbox"/> | Off-set <input type="checkbox"/> | Drawing <input type="checkbox"/> | Tribal Knowledge <input type="checkbox"/> | Rushing <input type="checkbox"/> | Heat Treat <input type="checkbox"/> | Cut Too Short <input type="checkbox"/> | Mislabeled <input type="checkbox"/> | Finish <input type="checkbox"/> | LOA <input type="checkbox"/> | Product Improvement <input type="checkbox"/> | Wave/Twist in Tube <input type="checkbox"/> | Instructions Incomplete/Unclear <input type="checkbox"/> | Fit/Function <input type="checkbox"/> | Misread <input type="checkbox"/> | Substation <input type="checkbox"/> | Process Improvement <input type="checkbox"/> | Marks/Chatter <input type="checkbox"/> | Drill Holes <input type="checkbox"/> | Misaligned/off center <input type="checkbox"/> | Turning Sequence <input type="checkbox"/> | Past Expiry Date <input type="checkbox"/> | Manufacturing Process <input type="checkbox"/> | OTHER : |  |
| Misidentified <input type="checkbox"/>                       | Past Due <input type="checkbox"/>           |                                                                                                                                                                                    |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |         |  |

**Work Order ID 162416**

Tuesday, June 06, 2017 4:57:32 PM

**\*162416\***

Page 2

Item ID: 646.3311 Accept **\*N900040100\*** Setup Start **\*NS1\***  
Revision ID: Stop **\*NS2\***  
Item Name: RH Half - Upper Cutter Assembly  
Start Date: 6/8/2017 Start Qty: 4.00 **\*4\*** Cust Item ID:  
Required Date: 6/29/2017 Req'd Qty: 4.00 **\*4\*** Customer:  
Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_ Run Start **\*NR1\***  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_ Stop **\*NR2\***

| Sequence ID/<br>Work Center ID                                   | Operation<br>Description                                                                                                                                                                                            | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp                          |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|-----------------------------------------|
| 130<br><b>*130*</b><br>QC<br>Quality Control                     | QC8- Inspect parts - second check<br><br>Memo                                                                                                                                                                       | 0.00<br><br>0.00     |         |        |              | 4             | 0             |                  | DAS<br>48<br>489<br>see e-m<br>last per |
| 140<br><b>*140*</b><br>Outsource4<br>Outsource process - Anodize | Outsource process-Anodize per QSI017 4.1.10.1<br><br>Memo<br>Issue P/O to ATG : <u>37017</u><br>1- Black Anodize as per Dwg 646.3300<br>2- PRIME AS PER DWG, SEE NOTE #2<br>Certification of Comformity is required | 0.00<br><br>0.00     |         |        |              | 4             |               |                  | 11/17/07/12                             |
| 150<br><b>*150*</b><br>Packaging<br>Packaging                    | Receive & Inspect for Damage & Mat'l Certs<br><br>Memo                                                                                                                                                              | 0.00<br><br>0.00     |         |        |              | 4             |               |                  | DAS<br>6<br>9-86<br>AUG 11 2017         |



DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |  |  |  |                                                                                                                                                            |  |
| Date :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | Step #:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | QTY Effective :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  | <b>MRB (QSI042) Approval</b><br><br>Completed By _____<br><br>Lead hand / Supervisor Approval Verification _____<br><br>QC / QA Coordinator Approval _____ |  |
| Description Work Order Deviation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |                                                                                                                                                            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |                                                                                                                                                            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |                                                                                                                                                            |  |
| <b>Root Cause</b><br><div style="display: flex; justify-content: space-between;"> <div>           Environment <input type="checkbox"/><br/>           Design <input type="checkbox"/><br/>           Doc/Data <input type="checkbox"/><br/>           Equip/Tooling <input type="checkbox"/><br/>           Handling/Pre <input type="checkbox"/><br/>           Material <input type="checkbox"/><br/>           Internal Transport <input type="checkbox"/><br/>           Tribal Knowledge <input type="checkbox"/><br/>           LOA <input type="checkbox"/><br/>           Substation <input type="checkbox"/><br/>           Past Expiry Date <input type="checkbox"/><br/>           Misidentified <input type="checkbox"/> </div> <div>           No Re-verification <input type="checkbox"/><br/>           Operator <input type="checkbox"/><br/>           Offset/Setup <input type="checkbox"/><br/>           Supplier <input type="checkbox"/><br/>           Training <input type="checkbox"/><br/>           Use for Testing <input type="checkbox"/><br/>           Poor Information <input type="checkbox"/><br/>           Rushing <input type="checkbox"/><br/>           Product Improvement <input type="checkbox"/><br/>           Process Improvement <input type="checkbox"/><br/>           Manufacturing Process <input type="checkbox"/><br/>           Past Due <input type="checkbox"/> </div> </div> |  | <div style="display: flex; justify-content: space-between;"> <div>           Pressure/Forced <input type="checkbox"/><br/>           Bending <input type="checkbox"/><br/>           Centre Not Concentric <input type="checkbox"/><br/>           Cracks <input type="checkbox"/><br/>           Crimp/Kink/Ripple/Wave <input type="checkbox"/><br/>           Cuffs <input type="checkbox"/><br/>           Crushing <input type="checkbox"/><br/>           Heat Treat <input type="checkbox"/><br/>           Wave/Twist in Tube <input type="checkbox"/><br/>           Marks/Chatter <input type="checkbox"/> </div> <div>           Temperature/Cure <input type="checkbox"/><br/>           Set-up <input type="checkbox"/><br/>           BOM/Route <input type="checkbox"/><br/>           Broken/Damage/Defect <input type="checkbox"/><br/>           Inspection Incomplete/Unqualified <input type="checkbox"/><br/>           Contamination <input type="checkbox"/><br/>           Countersink <input type="checkbox"/><br/>           Cut Too Short <input type="checkbox"/><br/>           Instructions Incomplete/Unclear <input type="checkbox"/><br/>           Drill Holes <input type="checkbox"/> </div> <div>           Power Loss/Surge <input type="checkbox"/><br/>           Folio/Program <input type="checkbox"/><br/>           Grain <input type="checkbox"/><br/>           Weld <input type="checkbox"/><br/>           Wrong Stock Pulled <input type="checkbox"/><br/>           Out of Sequence <input type="checkbox"/><br/>           Off-set <input type="checkbox"/><br/>           Misabeled <input type="checkbox"/><br/>           Fit/Function <input type="checkbox"/><br/>           Misaligned/off center <input type="checkbox"/> </div> <div>           Positioned Wrong <input type="checkbox"/><br/>           Outside Dimensions <input type="checkbox"/><br/>           Over/Under tolerance <input type="checkbox"/><br/>           Part Incorrect <input type="checkbox"/><br/>           Part Lost/Missing <input type="checkbox"/><br/>           Part Moved <input type="checkbox"/><br/>           Drawing <input type="checkbox"/><br/>           Finish <input type="checkbox"/><br/>           Misread <input type="checkbox"/><br/>           Turning Sequence <input type="checkbox"/> </div> </div> |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |                                                                                                                                                            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  | OTHER : <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |                                                                                                                                                            |  |

**Work Order ID 162416**

Tuesday, June 06, 2017 4:57:32 PM

**\*162416\***

Page 3

Item ID: 646.3311 Accept **\*N900040100\*** Setup Start **\*NS1\***  
Revision ID: Stop **\*NS2\***  
Item Name: RH Half - Upper Cutter Assembly  
Start Date: 6/8/2017 Start Qty: 4.00 **\*4\*** Cust Item ID:  
Required Date: 6/29/2017 Req'd Qty: 4.00 **\*4\*** Customer:  
Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_ Run Start **\*NR1\***  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_ Stop **\*NR2\***

| Sequence ID/<br>Work Center ID                | Operation<br>Description                                                                                                | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp                                      |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|-----------------------------------------------------|
| 155<br><b>*155*</b><br>QC<br>Quality Control  | QC5- Inspect part completeness to step on W/O<br><br>Memo<br>1.8 mils thickness prime                                   | 0.00<br><br>0.00     |         |        |              | 4             |               |                  | DAS<br>38<br>9-89<br>AUG 11 2017                    |
| 180<br><b>*180*</b><br>Packaging<br>Packaging | Identify as per dwg & Stock Location: CC1022<br><br>Memo<br>***IDENTIFY AS PER APICAL MPP-120 BY STAMPING P# AND REV*** | 0.00<br><br>0.00     |         |        |              | 4             |               |                  | DAS<br>6<br>9-89<br>AUG 14 2017                     |
| 190<br><b>*190*</b><br>QC<br>Quality Control  | QC21- Final Inspection - Work Order Release<br><br>Memo                                                                 | 0.00<br><br>0.00     |         |        |              |               |               |                  | DAS<br>21<br>9-89<br>AUG 15 2017<br><br>AUG 14 2017 |

DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                              |                                             |                                                                                                                                                                                    |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |                                  |  |  |  |
|--------------------------------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------|---------------------------------------------|-----------------------------------|---------------------------------------|------------------------------------------------|------------------------------------|--------------------------------|-----------------------------------------------|----------------------------------------|-----------------------------------|---------------------------------|-----------------------------------------------|-------------------------------|-----------------------------------------|---------------------------------------|-----------------------------------|-------------------------------------------------|------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------|------------------------------------------|--------------------------------|----------------------------------------|------------------------------------------|-------------------------------------|---------------------------------------------|-------------------------------------------|-----------------------------------|--------------------------------------|----------------------------------|----------------------------------|-------------------------------------------|----------------------------------|-------------------------------------|----------------------------------------|-------------------------------------|---------------------------------|------------------------------|----------------------------------------------|---------------------------------------------|----------------------------------------------------------|---------------------------------------|----------------------------------|-------------------------------------|----------------------------------------------|----------------------------------------|--------------------------------------|------------------------------------------------|-------------------------------------------|-------------------------------------------|------------------------------------------------|----------------------------------|--|--|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ |                                             | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> |                                           | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>             Skid-tube <input type="checkbox"/><br/>             Machining <input type="checkbox"/><br/>             Thermoforming <input type="checkbox"/><br/>             Large Fab <input type="checkbox"/> </div> <div>             Cross tube <input type="checkbox"/><br/>             Small Fab <input type="checkbox"/><br/>             Finishing <input type="checkbox"/><br/>             Composite <input type="checkbox"/> </div> <div>             Water Jet <input type="checkbox"/><br/>             Prod. Eng. Coord. <input type="checkbox"/><br/>             Rec/Store/Packaging <input type="checkbox"/><br/>             Supplier <input type="checkbox"/> </div> <div>             Engineering <input type="checkbox"/><br/>             Quality <input type="checkbox"/><br/>             Other <input type="checkbox"/> </div> </div> |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |                                  |  |  |  |
| Date :                                                       |                                             | Step #:                                                                                                                                                                            |                                           | QTY Effective :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |                                 | MRB (QSI042) Approval             |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |                                  |  |  |  |
| Description Work Order Deviation                             |                                             |                                                                                                                                                                                    |                                           | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                           |                                 |                                   | Completed By<br><br><br>Lead hand / Supervisor<br>Approval Verification<br><br><br>QC / QA Coordinator<br>Approval |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |                                  |  |  |  |
|                                                              |                                             |                                                                                                                                                                                    |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |                                  |  |  |  |
|                                                              |                                             |                                                                                                                                                                                    |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |                                  |  |  |  |
| Root Cause                                                   |                                             | FAULT CATEGORY                                                                                                                                                                     |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |                                  |  |  |  |
| Environment <input type="checkbox"/>                         | No Re-verification <input type="checkbox"/> | Pressure/Forced <input type="checkbox"/>                                                                                                                                           | Temperature/Cure <input type="checkbox"/> | Power Loss/Surge <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Positioned Wrong <input type="checkbox"/> | Design <input type="checkbox"/> | Operator <input type="checkbox"/> | Bending <input type="checkbox"/>                                                                                   | Set-up <input type="checkbox"/> | Folio/Program <input type="checkbox"/> | Outside Dimensions <input type="checkbox"/> | Doc/Data <input type="checkbox"/> | Offset/Setup <input type="checkbox"/> | Centre Not Concentric <input type="checkbox"/> | BOM/Route <input type="checkbox"/> | Grain <input type="checkbox"/> | Over/Under tolerance <input type="checkbox"/> | Equip/Tooling <input type="checkbox"/> | Supplier <input type="checkbox"/> | Cracks <input type="checkbox"/> | Broken/Damage/Defect <input type="checkbox"/> | Weld <input type="checkbox"/> | Part Incorrect <input type="checkbox"/> | Handling/Pre <input type="checkbox"/> | Training <input type="checkbox"/> | Crimp/Kink/Ripple/Wave <input type="checkbox"/> | Inspection Incomplete/Unqualified <input type="checkbox"/> | Wrong Stock Pulled <input type="checkbox"/> | Part Lost/Missing <input type="checkbox"/> | Material <input type="checkbox"/> | Use for Testing <input type="checkbox"/> | Cuffs <input type="checkbox"/> | Contamination <input type="checkbox"/> | Out of Sequence <input type="checkbox"/> | Part Moved <input type="checkbox"/> | Internal Transport <input type="checkbox"/> | Poor Information <input type="checkbox"/> | Crushing <input type="checkbox"/> | Countersink <input type="checkbox"/> | Off-set <input type="checkbox"/> | Drawing <input type="checkbox"/> | Tribal Knowledge <input type="checkbox"/> | Rushing <input type="checkbox"/> | Heat Treat <input type="checkbox"/> | Cut Too Short <input type="checkbox"/> | Mislabeled <input type="checkbox"/> | Finish <input type="checkbox"/> | LOA <input type="checkbox"/> | Product Improvement <input type="checkbox"/> | Wave/Twist in Tube <input type="checkbox"/> | Instructions Incomplete/Unclear <input type="checkbox"/> | Fit/Function <input type="checkbox"/> | Misread <input type="checkbox"/> | Substation <input type="checkbox"/> | Process Improvement <input type="checkbox"/> | Marks/Chatter <input type="checkbox"/> | Drill Holes <input type="checkbox"/> | Misaligned/off center <input type="checkbox"/> | Turning Sequence <input type="checkbox"/> | Past Expiry Date <input type="checkbox"/> | Manufacturing Process <input type="checkbox"/> | OTHER : <input type="checkbox"/> |  |  |  |
| Misidentified <input type="checkbox"/>                       | Past Due <input type="checkbox"/>           |                                                                                                                                                                                    |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |                                 |                                   |                                                                                                                    |                                 |                                        |                                             |                                   |                                       |                                                |                                    |                                |                                               |                                        |                                   |                                 |                                               |                               |                                         |                                       |                                   |                                                 |                                                            |                                             |                                            |                                   |                                          |                                |                                        |                                          |                                     |                                             |                                           |                                   |                                      |                                  |                                  |                                           |                                  |                                     |                                        |                                     |                                 |                              |                                              |                                             |                                                          |                                       |                                  |                                     |                                              |                                        |                                      |                                                |                                           |                                           |                                                |                                  |  |  |  |



# Picklist Print

Monday, June 05, 2017 4:53:48 PM

Page 127

Work Order ID: 162416

**\*162416\***

Parent Item: 646.3311

**\*646 3311\***

Parent Item Name: RH Half - Upper Cutter Assembly

Start Date: 6/8/2017

Required Date: 6/29/2017

Start Qty: 4.00

Required Qty: 4.00

Comments: IPP REV:A NEW ISSUE 12/11/27 JFS VERIFY BY: JLM

| Component Item ID/<br>Item Name                          | Replacement<br>Item ID | Mfg/<br>Purch | Bin<br>Item | Primary<br>Location | Last<br>Location | Route<br>Seq ID | Unit of<br>Measure | Qty on<br>Hand | Qty per Kit | Total<br>Qty | Qty<br>Issued | Date<br>Issued | Status |
|----------------------------------------------------------|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|-------------|--------------|---------------|----------------|--------|
| M7075T6B7.000X2.000                                      |                        | Purchased     | No          |                     |                  | 110             | f                  | 11.1500        | 1.115       | 4.694737     |               |                |        |
| <b>*M7075T6B7 000X2 000*</b>                             |                        |               |             |                     |                  |                 |                    |                | **          |              |               |                |        |
| 7075-T6 BAR 7.000" X 2.000" (order in billets - 13.375") |                        |               |             |                     |                  |                 |                    |                |             |              |               |                |        |

Location

Loc Qty

Loc Code

MAT001

11.150001

m137090

0.000001

→ m137365

11.15

**4.5**

**DAS**  
**49**  
**9-89** / **Kt 17-06-14**





# APICAL

INDUSTRIES, INC.

ENGINEERING CHANGE NOTICE NO.

04765

SHEET 1 OF 1

DWG NO. 646.3300

REV: NC

PREPARED BY J. SOTO

DATE: 12/08/2014

EFFECT ON DWG  
☐ INC. ☒ UNINC.

DWG TITLE: UPPER CUTTER ASSY

APPROVED BY: ENGR. *[Signature]*

MFG. *[Signature]* QC *[Signature]*

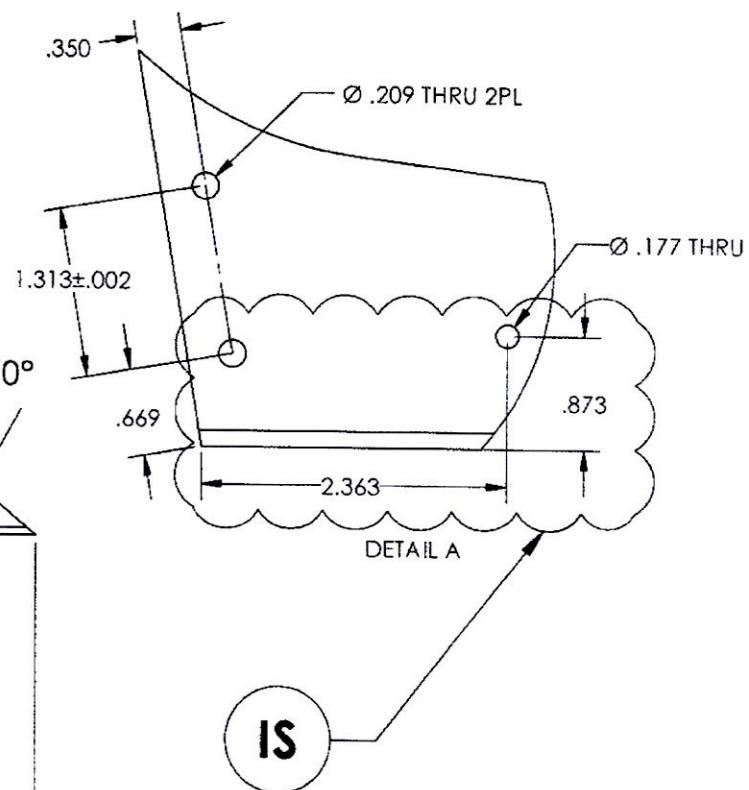
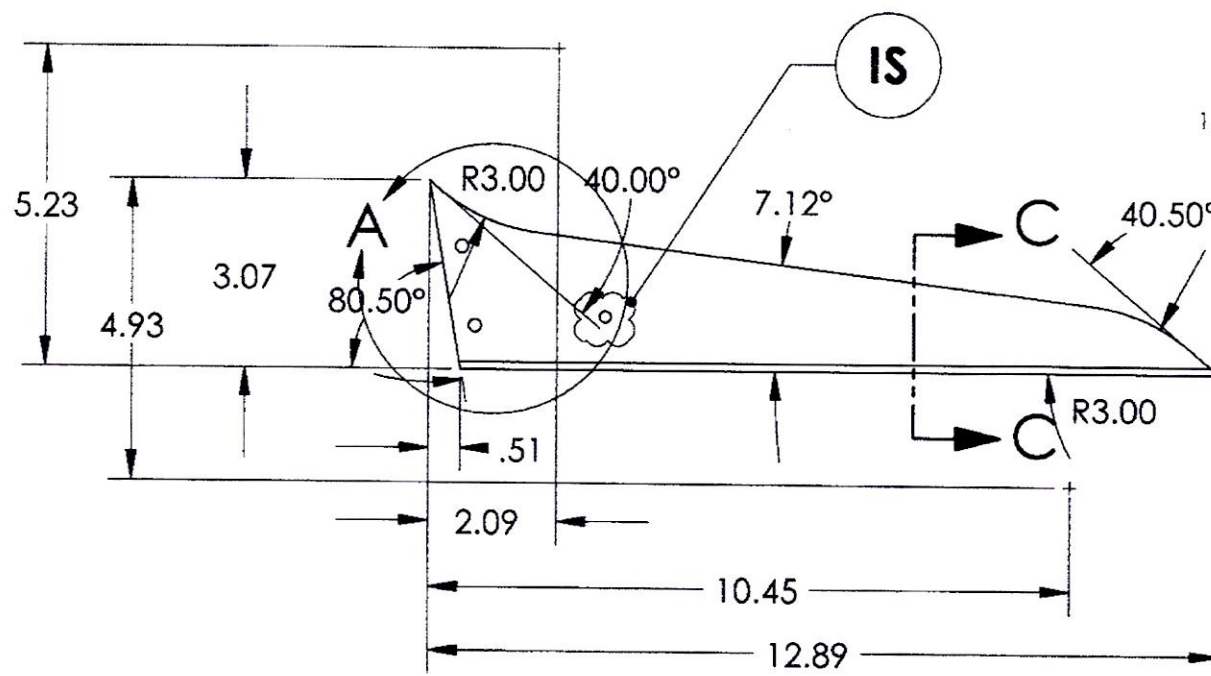
EFF. NEXT ORDER

TRANSACTION CODES (TC):  
A-ADD  
C-CREATE  
R-REVISE  
D-DELETE

REASON: ADDED HOLE DIMENSION TO 646.3313.

**SHEET 5 IS:**

*W/S 16246*



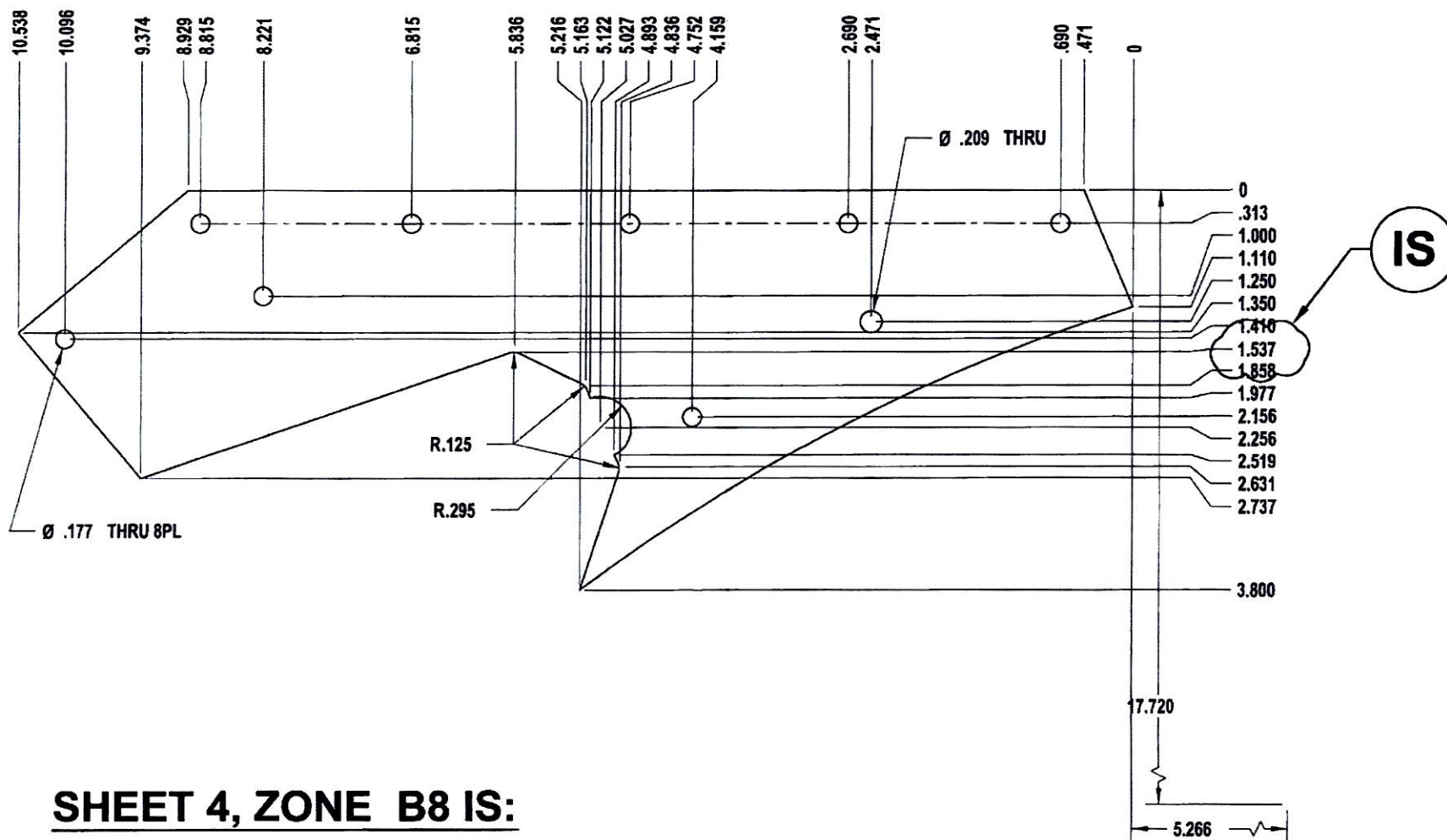
DOCUMENTS EFFECTED:

☐ MDL ☐ INSTALL INSTRUCTIONS ☐ ICA ☐ FMS ☐ BOM

CHANGE CATEGORY  
☐ MAJOR ☒ MINOR

DER REVIEW REQUIRED  
☐ YES ☒ NO

|                                                                |                                     |                                     |                       |                 |                                                                                           |               |
|----------------------------------------------------------------|-------------------------------------|-------------------------------------|-----------------------|-----------------|-------------------------------------------------------------------------------------------|---------------|
| APICAL<br>INDUSTRIES, INC.                                     | ENGINEERING CHANGE NOTICE NO. 03724 |                                     |                       |                 | SHEET 1 OF 1                                                                              |               |
|                                                                | DWG NO. 646.3300                    | REV: N/C                            | PREPARED BY B. PETERS | DATE: 12/05/12  | EFFECT ON DWG<br><input type="checkbox"/> INC. <input checked="" type="checkbox"/> UNINC. |               |
|                                                                | DWG TITLE: UPPER CUTTER ASSY        |                                     |                       |                 |                                                                                           |               |
| APPROVED BY: ENGR <i>[Signature]</i>                           |                                     | MFG <i>[Signature]</i>              | QC <i>[Signature]</i> | EFF: NEXT ORDER |                                                                                           |               |
| TRANSACTION CODES (TC):<br>A-ADD C-CREATE<br>R-REVISE D-DELETE |                                     | REASON: REVISED ORDINATE DIMENSION. |                       |                 |                                                                                           | ECR: D-12-025 |



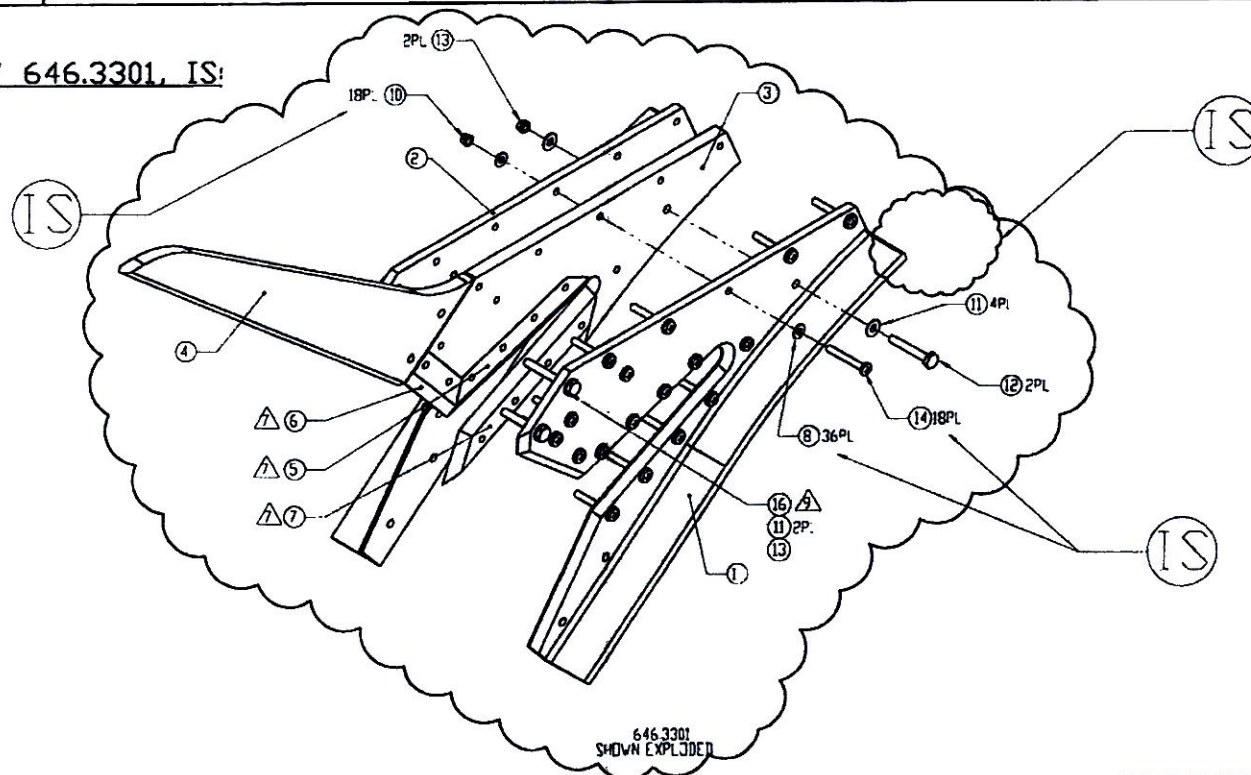
**SHEET 4, ZONE B8 IS:**

|                     |                                                                                                                                                               |                                                                                             |                                                                                            |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| DOCUMENTS EFFECTED: | <input type="checkbox"/> RFMS <input type="checkbox"/> MDL <input type="checkbox"/> INSTALL INSTRUC <input type="checkbox"/> ICA <input type="checkbox"/> BOM | CHANGE CATEGORY<br><input type="checkbox"/> MAJOR <input checked="" type="checkbox"/> MINOR | DER REVIEW REQUIRED<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|



|                                                                |                                                                                           |                                                      |                       |                 |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------|-----------------|
| APICAL<br>INDUSTRIES, INC.                                     | ENGINEERING CHANGE NOTICE NO. 02196                                                       |                                                      | SHEET 1 OF 2          |                 |
|                                                                | DWG NO. 646.3300                                                                          | REV: N/C                                             | PREPARED BY S. HUFF   | DATE: 01/05/09  |
|                                                                | EFFECT ON DWG<br><input type="checkbox"/> INC. <input checked="" type="checkbox"/> UNINC. |                                                      |                       |                 |
|                                                                | DWG TITLE: UPPER CUTTER ASSY                                                              |                                                      |                       |                 |
| APPROVED BY: ENGR <i>[Signature]</i>                           |                                                                                           | MFG <i>[Signature]</i>                               | QC <i>[Signature]</i> | EFF: NEXT ORDER |
| TRANSACTION CODES (TC):<br>A-ADD C-CREATE<br>R-REVISE D-DELETE |                                                                                           | REASON: REMOVED RIVETS IN FAVOR OF ADDITIONAL SCREWS |                       |                 |

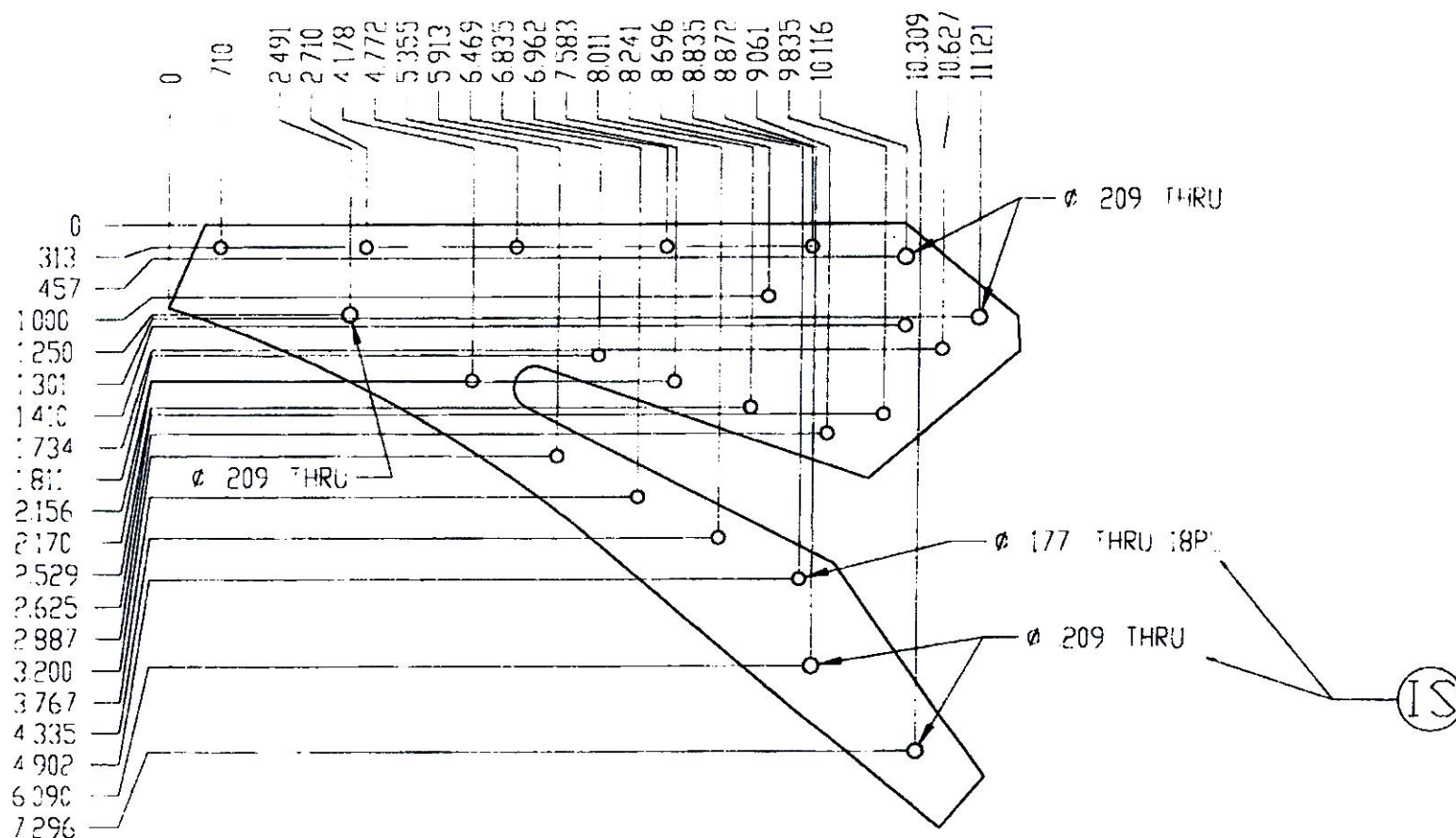
SHEET 1, VIEW 646.3301, IS:



| 14                                                                                                                                                                                           | R           | 601.2765 | 18          | SCREW                  | MS27039-0819                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------|-------------|------------------------|--------------------------------------------------------------------------|
| 10                                                                                                                                                                                           | R           | 601.1541 | 18          | LOCKNUT                | MS21042L08                                                               |
| 9                                                                                                                                                                                            | D           | 601.2766 | 3           | RIVET                  | MS20470AD5-18                                                            |
| 8                                                                                                                                                                                            | R           | 601.2764 | 36          | WASHER                 | NAS1149FN832P                                                            |
|                                                                                                                                                                                              |             |          | .3301       |                        |                                                                          |
| F/N TC                                                                                                                                                                                       | PART NUMBER | QTY      | DESCRIPTION | MATERIAL/SPECIFICATION |                                                                          |
| DOCUMENTS EFFECTED:                                                                                                                                                                          |             |          |             |                        | CHANGE CATEGORY                                                          |
| <input type="checkbox"/> MDL <input checked="" type="checkbox"/> INSTALL INSTRU <input checked="" type="checkbox"/> ICA <input type="checkbox"/> FMS <input checked="" type="checkbox"/> BOM |             |          |             |                        | DER REVIEW REQUIRED                                                      |
|                                                                                                                                                                                              |             |          |             |                        | <input type="checkbox"/> MAJOR <input checked="" type="checkbox"/> MINOR |
|                                                                                                                                                                                              |             |          |             |                        | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO      |



## SHEET 3, SECTION VIEW A-A, IS:



| F/N | TC | PART NUMBER | QTY | DESCRIPTION | MATERIAL/SPECIFICATION |
|-----|----|-------------|-----|-------------|------------------------|
|-----|----|-------------|-----|-------------|------------------------|

| REVISION |             |      |          |
|----------|-------------|------|----------|
| REV.     | DESCRIPTION | DATE | APPROVED |
|          |             |      |          |
|          |             |      |          |
|          |             |      |          |



02196, 03724, 04765

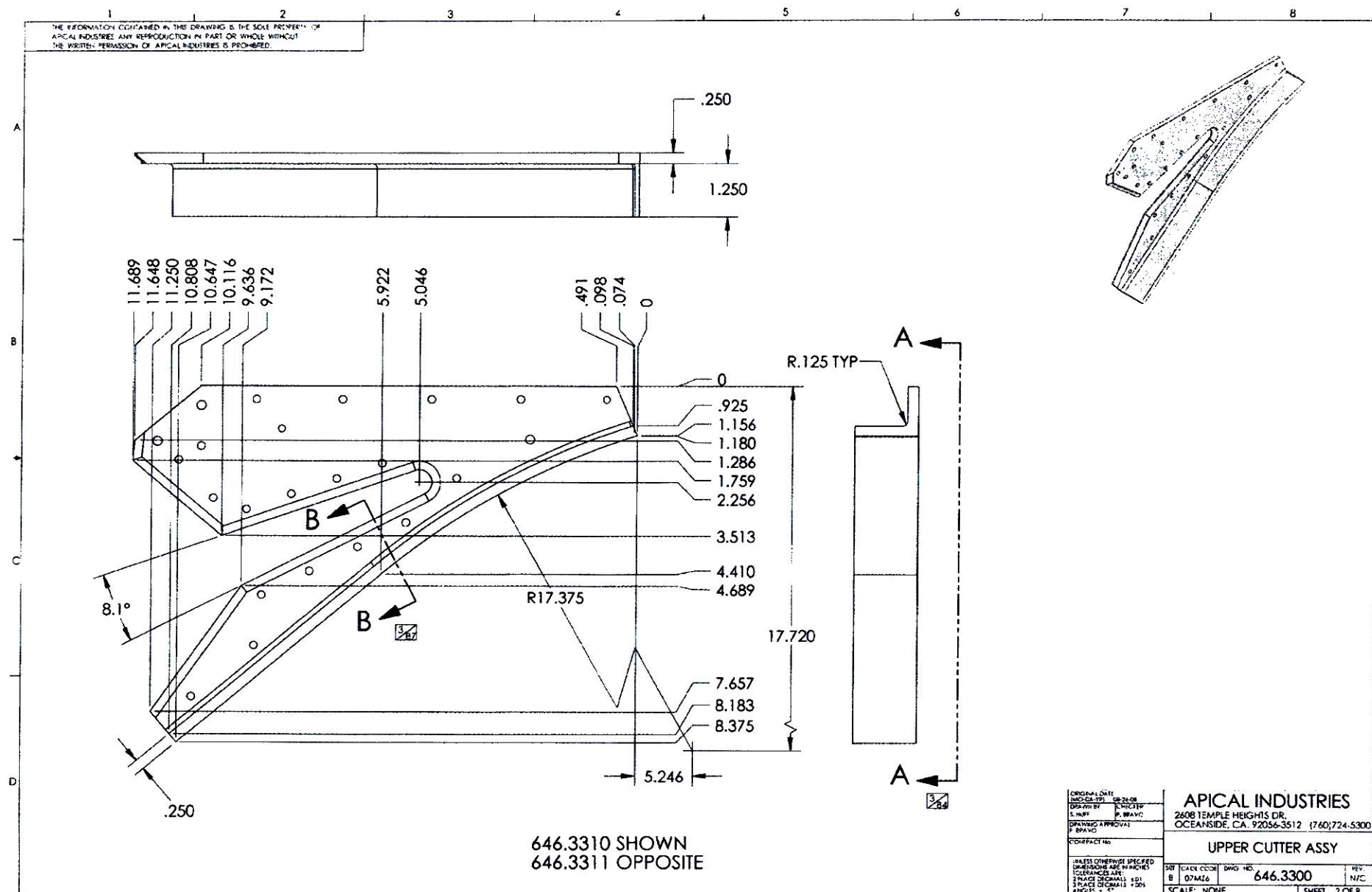
① MATERIAL: ALUMINUM 7075-T651 PER AMS-QQ-A-250/12

② FINISH: HARD ANODIZE IAW MIL-A-8625 TYPE III.  
CLASS 2, COLOR BLACK;  
CARDINAL 4860-50 PRETREATMENT PRIMER  
PRIME IAW MIL-P-23377J TYPE I CLASS N

③ MATERIAL: AISI A2 TOOL STEEL  
CONDITION: ANNEALED  
POST PROCESS: HEAT TREAT TO 58-62 Rc ROCKWELL HARDNESS

[illegible][illegible]

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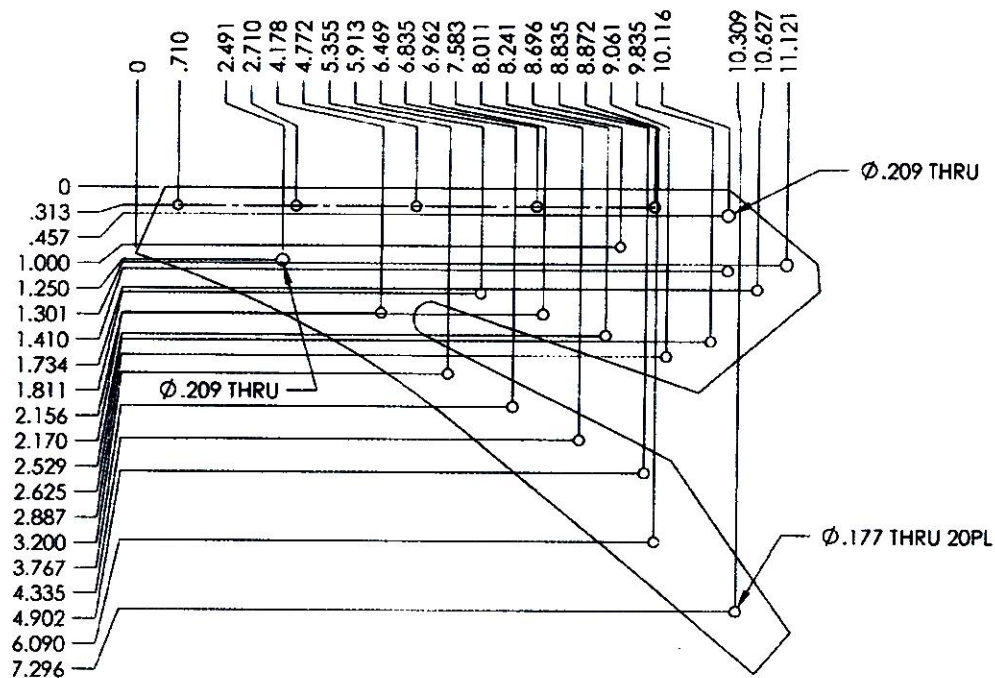


|                                                                                                                                              |                        |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| ORIGINAL DATE<br>(MM-DD-YY)                                                                                                                  | 08-26-08               |
| DESIGNED BY<br>S. HUFF                                                                                                                       | CHECKED BY<br>P. BRAWO |
| DRAWING APPROVAL<br>P. BRAWO                                                                                                                 |                        |
| CONTRACT No.                                                                                                                                 |                        |
| UNLESS OTHERWISE SPECIFIED<br>DIMENSIONS ARE IN INCHES<br>TOLERANCES ARE:<br>2 PLACE DECIMALS ±.01<br>3 PLACE DECIMALS ±.005<br>INCHES .005" |                        |

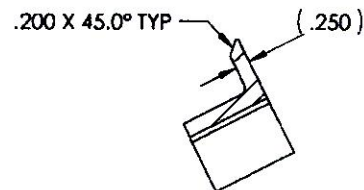
|                                                                                                |                    |                            |             |
|------------------------------------------------------------------------------------------------|--------------------|----------------------------|-------------|
| <b>APICAL INDUSTRIES</b><br>2608 TEMPLE HEIGHTS DR.<br>OCEANSIDE, CA. 92056-3512 (760)724-5300 |                    |                            |             |
| <b>UPPER CUTTER ASSY</b>                                                                       |                    |                            |             |
| SIZE<br>B                                                                                      | CADR CODE<br>07M16 | DWG NO.<br><b>646.3300</b> | REV.<br>N/C |
| SCALE: NONE                                                                                    |                    | SHEET 2 OF 8               |             |



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SECTION A-A

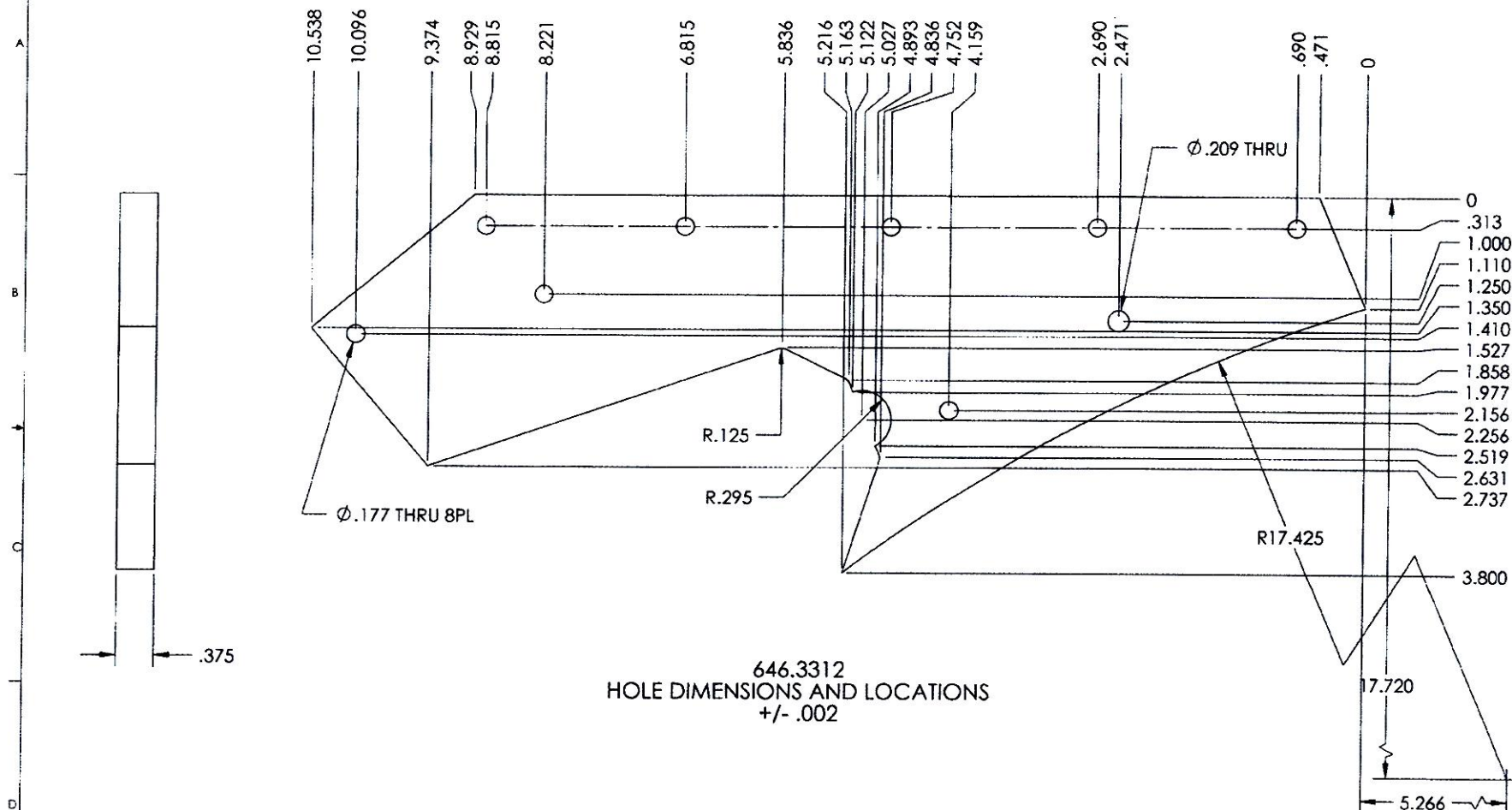


SECTION B-B

|                                                                                                                                                        |                                    |                                                                                                 |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------|----------|
| ORDER DATE: 10-24-98<br>ORDER BY: J. BRYAN<br>ORDER APPROVAL:                                                                                          |                                    | <b>APICAL INDUSTRIES</b><br>2608 TEMPLE HEIGHTS DR.<br>OCEANSIDE, CA. 92056-3512 (760) 724-5300 |          |
| CONTRACT NO.:                                                                                                                                          |                                    | <b>UPPER CUTTER ASSY</b>                                                                        |          |
| SCALE: CONFORM WITH SPEC<br>DIMENSIONS ARE IN INCHES<br>TOLERANCES ARE:<br>1 PLACE DECIMALS ±.01<br>2 PLACES DECIMALS ±.005<br>3 PLACES DECIMALS ±.001 | REV: 1<br>DATE CODE: B<br>07/02/00 | DWG NO: 646.3300                                                                                | REV: N/C |
| SCALE: NONE                                                                                                                                            |                                    | SHEET 3 OF 8                                                                                    |          |

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| REV | DESCRIPTION | DATE | APPROVED |
|-----|-------------|------|----------|
|     |             |      |          |
|     |             |      |          |
|     |             |      |          |

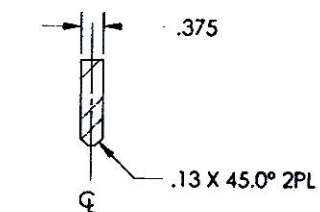
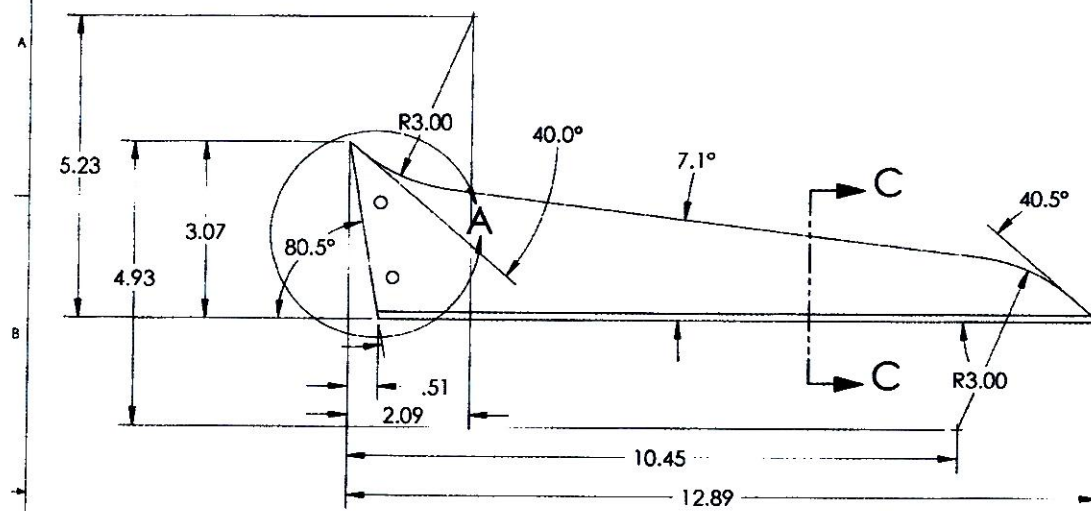


646.3312  
HOLE DIMENSIONS AND LOCATIONS  
+/- .002

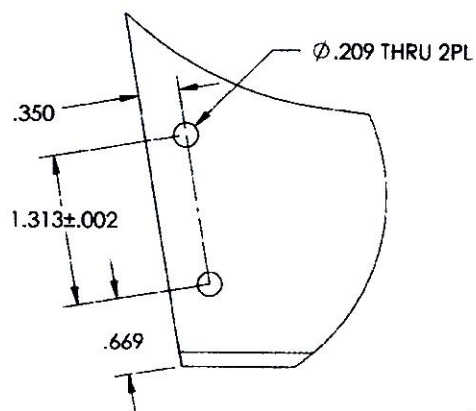
|                                                                                                                                            |                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| ORIGINAL DATE<br>08-26-08                                                                                                                  | APICAL INDUSTRIES                                                  |
| DESIGNED BY<br>P. BRAYO                                                                                                                    | 2608 TEMPLE HEIGHTS DR.<br>OCEANSIDE, CA. 92056-3512 (760)724-5300 |
| DRAWING APPROVAL<br>P. BRAYO                                                                                                               | UPPER CUTTER ASSY                                                  |
| CHECKED BY<br>P. BRAYO                                                                                                                     | REV<br>B 07/02/08 646.3300 N/C                                     |
| 3D MODEL<br>P. BRAYO                                                                                                                       | SCALE<br>NONE                                                      |
| 1:1000 CONFORM SPECIFIED<br>DIMENSIONS ARE IN INCHES<br>TOLERANCES ARE<br>2 PLACES DECIMALS ±.01<br>3 PLACES DECIMALS ±.005<br>ANGLES ±.5° | SHEET 4 OF 8                                                       |

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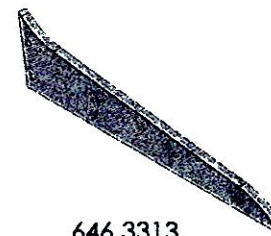
| REVISION |             | DATE | APPROVED |
|----------|-------------|------|----------|
| REV      | DESCRIPTION |      |          |
|          |             |      |          |
|          |             |      |          |



SECTION C-C



DETAIL A



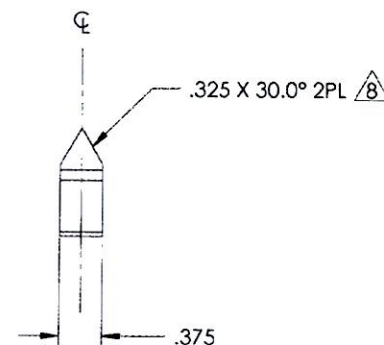
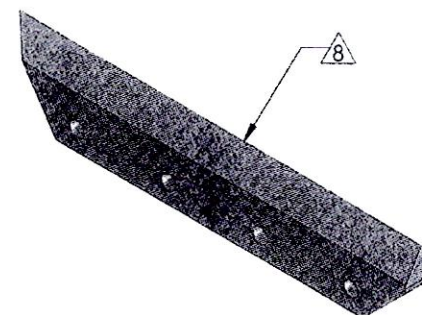
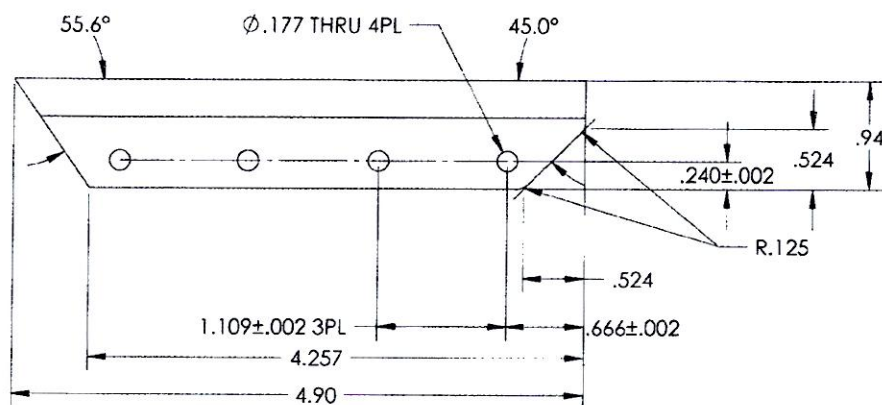
646.3313

|                                                                                                                                                    |                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| ORIGINAL DATE<br>2400-DL-1011 05-20-08                                                                                                             | <b>APICAL INDUSTRIES</b><br>2608 TEMPLE HEIGHTS DR.<br>OCEANSIDE, CA. 92056-3512 (760) 724-5300 |
| DRAWN BY<br>J. HUP                                                                                                                                 |                                                                                                 |
| CHECKED BY<br>P. BRANC                                                                                                                             |                                                                                                 |
| DESIGNED BY<br>J. HUP                                                                                                                              |                                                                                                 |
| APPROVED BY<br>P. BRANC                                                                                                                            |                                                                                                 |
| CONTRACT NO.                                                                                                                                       |                                                                                                 |
| <b>UPPER CUTTER ASSY</b>                                                                                                                           |                                                                                                 |
| UNLESS OTHERWISE SPECIFIED<br>DIMENSIONS ARE IN INCHES<br>TOLERANCES ARE:<br>FRACTIONS DECIMALS ANGLES<br>1/16" 0.0001 0.001<br>1/16" 0.0001 0.001 | SHEET 8<br>DWG NO. 646.3300<br>SCALE NONE                                                       |
|                                                                                                                                                    | REV. N/C<br>SHEET 5 OF 6                                                                        |



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| REV. | DESCRIPTION | DATE | APPROVED |
|------|-------------|------|----------|
|      |             |      |          |
|      |             |      |          |
|      |             |      |          |

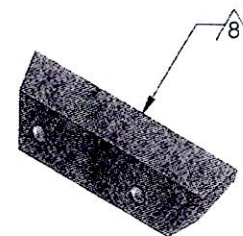
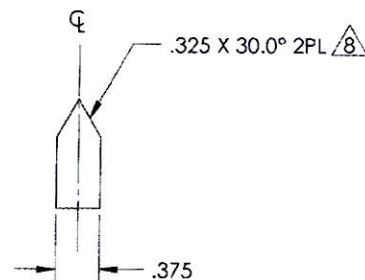
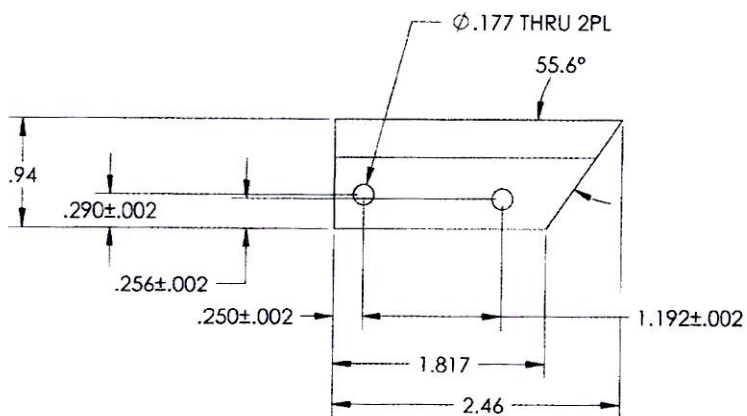


646.3314

|                                                                                                                                                                                          |                                                                                         |                   |          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------|----------|
| THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF APICAL INDUSTRIES AND REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF APICAL INDUSTRIES IS PROHIBITED. |                                                                                         |                   |          |
| DESIGNED BY: J. HUN<br>DRAWN BY: J. HUN<br>CHECKED BY: J. HUN<br>APPROVED BY: J. HUN                                                                                                     | APICAL INDUSTRIES<br>2608 TEMPLE HEIGHTS DR.<br>OCEANSIDE, CA 92056-3512 (760) 724-5300 | UPPER CUTTER ASSY | 646.3300 |
| UNLESS OTHERWISE SPECIFIED<br>DIMENSIONS ARE IN INCHES<br>DECIMALS ARE<br>2 PLACES DECIMALS FOLLOWS<br>3 PLACES DECIMALS FOLLOWS                                                         | SET: B<br>CATCHER: 07/22/20                                                             | DWG. NO: 646.3300 | REV: N/C |
| SCALE: NONE                                                                                                                                                                              | SHEET: 6 OF 8                                                                           | 646.3300          | 646.3300 |

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| REVISIONS |             |      |          |
|-----------|-------------|------|----------|
| REV.      | DESCRIPTION | DATE | APPROVED |
|           |             |      |          |
|           |             |      |          |

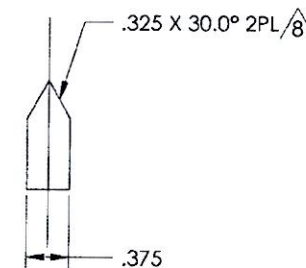
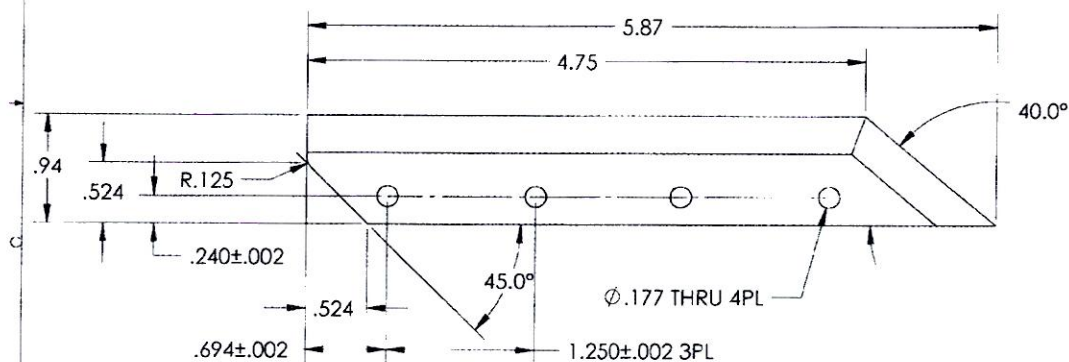
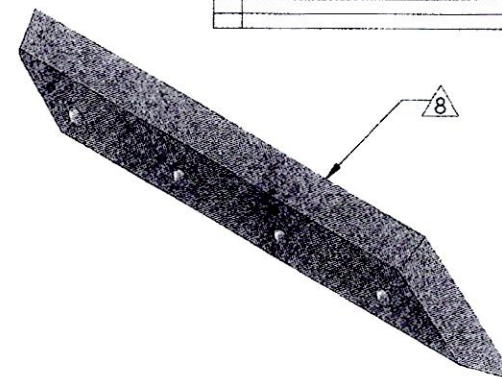


646.3315

|                                                                                                                                                      |                                                                                                |                      |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------|--------------|
| ORIGINAL DATE: 06-26-08<br>DRAWN BY: S. HUI<br>CHECKED BY: P. BRAYO                                                                                  | <b>APICAL INDUSTRIES</b><br>2608 TEMPLE HEIGHTS DR<br>OCEANSIDE, CA, 92056-3512 (760) 724-5300 |                      |              |
| DRAWING APPROVAL:<br>P. BRAYO<br>DATE: 08-26-08<br>CONTRACT NO.:                                                                                     | <b>UPPER CUTTER ASSY</b>                                                                       |                      |              |
| UNLESS OTHERWISE SPECIFIED<br>DIMENSIONS ARE IN INCHES<br>TOLERANCES ARE:<br>3 PLACE DECIMALS 1.01<br>2 PLACE DECIMALS .005<br>ANGLES $\pm .5^\circ$ | REV: 8<br>CAGE CODE: 646.3300<br>SCALE: NONE                                                   | QWY: N/A<br>REV: N/C | SHEET 7 OF 8 |

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| REV | DESCRIPTION | DATE | APPROVED |
|-----|-------------|------|----------|
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|     |             |      |          |



646.3316

|                                                                                                                                       |                     |                                                                    |                      |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------------------------------------------------------|----------------------|
| ORIGINAL DATE<br>10/04/10                                                                                                             | 10-26-10            | APICAL INDUSTRIES                                                  |                      |
| DRAWN BY<br>S. HUI                                                                                                                    | CHECKED<br>P. BRADY | 2608 TEMPLE HEIGHTS DR.<br>OCEANSIDE, CA. 92056-3512 (760)724-5300 |                      |
| DRAWING APPROVAL<br>P. BRADY                                                                                                          | 10-26-10            | UPPER CUTTER ASSY                                                  |                      |
| CONTRACT NO.                                                                                                                          |                     | REV<br>B                                                           | 07/10/12             |
| DIMENSIONS SPECIFIED<br>DIMENSIONS ARE IN INCHES<br>TOLERANCES ARE:<br>2 PLACE DECIMALS ±.01<br>3 PLACE DECIMALS ±.001<br>ANGLES ±.5° |                     | SCALE<br>NONE                                                      | DWG. NO.<br>646.3300 |
|                                                                                                                                       |                     |                                                                    | REV<br>N/A           |
|                                                                                                                                       |                     |                                                                    | SHEET<br>8 OF 8      |



## Jean-Luc Menard

---

**From:** Pablo Bravo  
**Sent:** Wednesday, March 09, 2016 12:01 PM  
**To:** Jean-Luc Menard  
**Subject:** RE: 646.3310/646.3311 DEVIATION

JL,

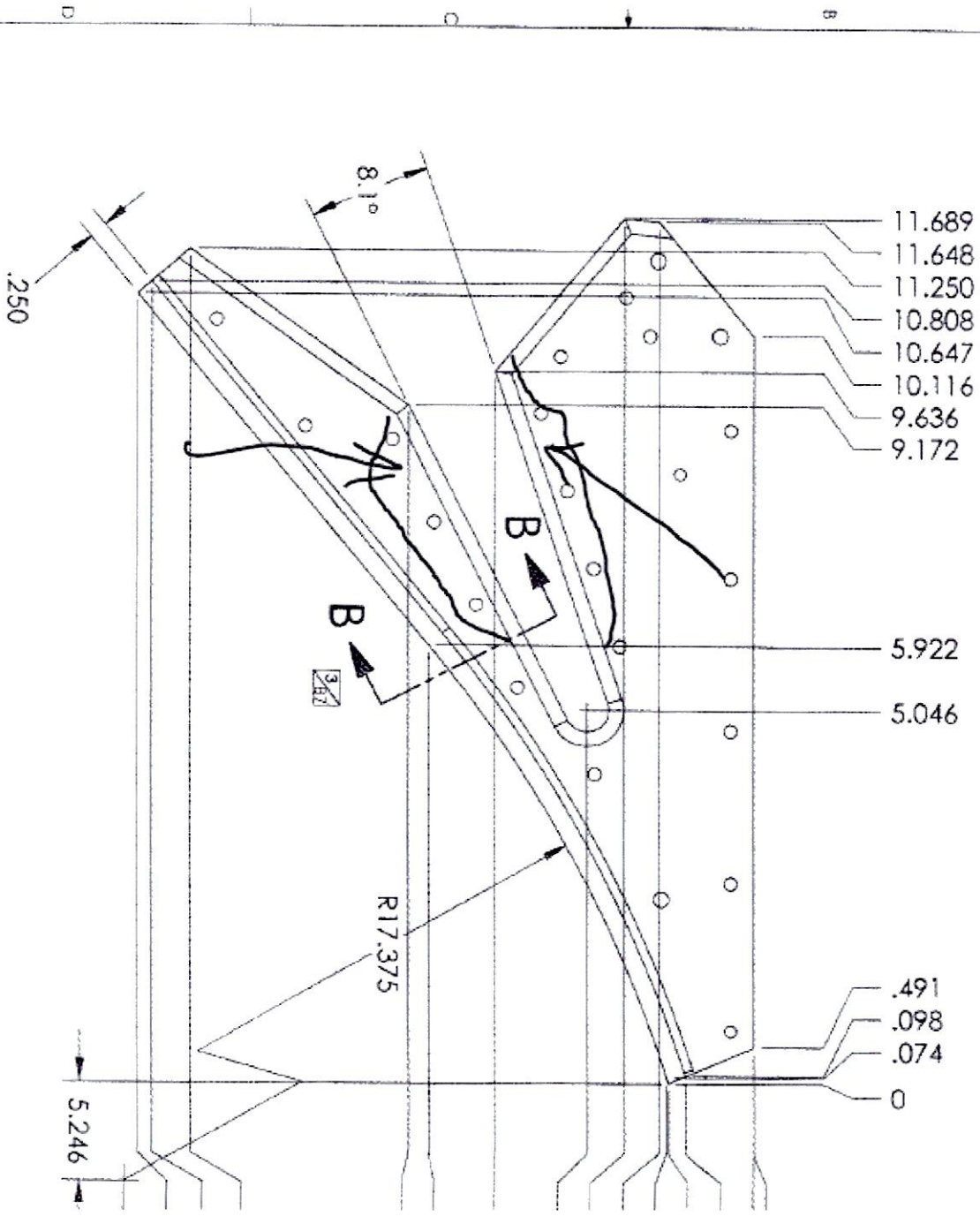
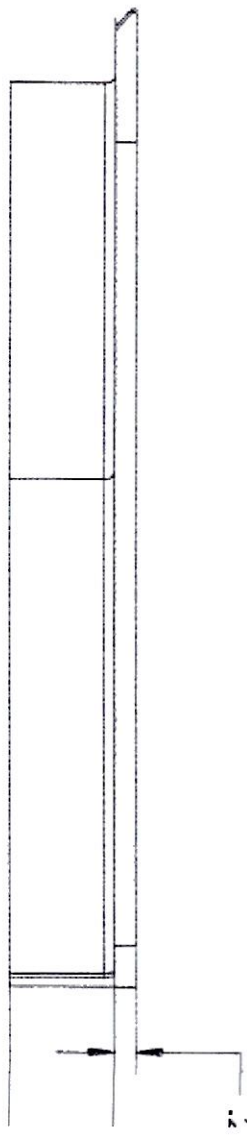
As long as the mating parts fit fine, this should be okay.

Pablo

---

**From:** Jean-Luc Menard  
**Sent:** Wednesday, March 09, 2016 5:09 AM  
**To:** Pablo Bravo  
**Subject:** 646.3310/646.3311 DEVIATION

Hi Pablo,  
WE have a part coming in at .242" in the area shown, is this deviation acceptable?  
Thx  
JL



**Jean-Luc Menard**  
Production Engineering Supervisor

**DART AEROSPACE**

T 1 613 632-5200 > 227

F 1 613 632-5246

1 800 556-4166

[www.dartaerospace.com](http://www.dartaerospace.com)



A.T.G. Industries Inc.  
731 Industrielle Street  
Rockland, ON K4K 1T2  
Canada

Ph: (613) 446-4544

Fax: (613) 446-4556

### Pack List

Number: 913644

Date: 08-Aug-17

To

Dart Aerospace Ltd  
1270 Aberdeen St  
Hawkesbury, ON K6A 1K7

Ship To

Chantal Lavoie  
Dart Aerospace Ltd  
1270 Aberdeen St  
Hawkesbury, ON K6A 1K7

Ph: 613 632-9577

Fax: 613 632-1053

Ph: 613 632-9577

Fax: 613 632-1053

| Terms           |                                                                                                                                                                                                                                                               | Ship Via  |                                                    |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------|
|                 |                                                                                                                                                                                                                                                               | OUR TRUCK |                                                    |
| Quantity        | Description                                                                                                                                                                                                                                                   |           |                                                    |
|                 | Please reference this document's Pack List number on all correspondences regarding this shipment. If you have any questions, please contact us.                                                                                                               |           |                                                    |
| 12<br>ea        | Part: 647.1512<br>Breakaway Tip<br>Hard Black Anodize per MIL-A-8625F, Type III, Class 2, .0005-.0045" (.5 - 4.5mils)<br>Prime per MIL-PRF-23377, Type I, Class N (Customer Supplied), .0001-.0002" (1 - 2 mils) per drawing.<br>Job: 21381                   |           | Rev: D<br><br><br><br><br>PO: PO37017<br>Line: 13  |
| 4<br>ea         | Part: 647.7611<br>Lower Deflector<br>Hard Black Anodize per MIL-A-8625F, Type III, Class 2, .0005-.0045" (.5 - 4.5mils)<br>Prime per MIL-PRF-23377, Type I, Class N (Customer Supplied), .0001-.0002" (1 - 2 mils) per drawing.<br>Job: 21385                 |           | Rev: NC<br><br><br><br><br>PO: PO37017<br>Line: 17 |
| 1<br>ea         | Part: ADMINISTRATION FEE<br>Administrative Fee<br>Job: 21387                                                                                                                                                                                                  |           | Rev: N/A<br><br><br>PO: PO37017<br>Line: 19-20     |
| 4<br>ea         | Part: 646.3011<br>RH Half<br>Hard Black Anodize per MIL-A-8625F, Type III, Class 2, .0005-.0045" (.5 - 4.5mils)<br>Prime per MIL-PRF-23377, Type I, Class N (Customer Supplied), .0006-.0009" (.6 - .9 mils) per drawing.<br>Job: 21370                       |           | Rev: NC<br><br><br><br><br>PO: PO37017<br>Line: 2  |
| 4<br>ea         | Part: 646.3311<br>RH Half Upper Cutter Assembly<br>Hard Black Anodize per MIL-A-8625F, Type III, Class 2, .0005-.0045" (.5 - 4.5mils)<br>Prime per MIL-PRF-23377, Type I, Class N (Customer Supplied), .0006-.0009" (.6 - .9 mils) per drawing.<br>Job: 21372 |           | Rev: NC3<br><br><br><br><br>PO: PO37017<br>Line: 4 |
| Made in Canada. |                                                                                                                                                                                                                                                               |           |                                                    |





Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, ON K6A 1K7  
Tel: 613 632 9577  
Fax: 613 632 1053

PURCHASE ORDER  
Purchase Order ID PO37017

Purchase Order Date 7/12/2017  
PO Print Date 7/19/2017

Page Number 2 of 9

Order From:

A.T.G. INDUSTRIES INC.  
731 INDUSTRIELLE ROAD  
ROCKLAND, ON K4K 1T2  
CANADA

VC-ATG001

Ship To: DART AEROSPACE LTD  
1270 ABERDEEN  
HAWKESBURY, ON K6A 1K7  
CANADA

Contact Name  
Vendor Phone 613-446-4544

Ship To Contact  
Ship To Phone  
Ship Via: VENDOR'S TRUCK  
Ship Acct:

Buyer Diane Baker  
Customer POID  
Customer Tax # 10127-2607  
Terms Net 30  
Currency CAD  
FOB FCA - (Free Carrier)

3 162466 646 3210 Support REV 7/19/2017  
N/C Yes  
7/19/2017

7.00 ✓ \$14.35 \$100

AS PER MPP-172 SECTION 2.1.  
HARD ANODIZE COLOR BLACK, PER IAW MIL-A-8625 TYPE 3 CLASS 2  
AS PER MPP-172 SECTION 4.2.  
PRIME AS PER IAW MIL-PRF-23377 TYPE 1 CLASS N

SPN-8-9

Line Total: \$100

4 162416 646 3311 RH Half - Upper  
Cutter Assembly REV 8/14/2017  
N/C Yes  
8/14/2017

4.00 \$18.10 \$72

AS PER MPP-172 SECTION 2.1.  
HARD ANODIZE COLOR BLACK, PER IAW MIL-A-8625 TYPE 3 CLASS 2  
AS PER MPP-172 SECTION 4.2.  
PRIME AS PER IAW MIL-PRF-23377 TYPE 1 CLASS N

Line Total: \$72

PO Instructions: PRIMER IS SUPPLIED BY DART

Note:

7/19/2017